

In this issue...

| | |
|---|----|
| Navy Medicine R&D Attends MHSRS | 1 |
| COs Messages | 2 |
| NMRC License Enables Commercialization | 4 |
| NAMRU-2 CO Attends Ribbon Cutting | 4 |
| Navy SG Visits NSMRL | 5 |
| JCC Research Team Discusses Future Field Work | 6 |
| BUMED Director (M1) Tours NAMRU-SA | 7 |
| Bayesian Network Analysis | 8 |
| Dr. Walz to Retire in October | 9 |
| A New Frontier for TBI | 10 |
| NAMRU-D Joint Effort on Pilot Monitoring System | 11 |
| R&D Chronicles | 12 |

More stories inside

NMR&D News is a publication of the Naval Medical Research Center, 503 Robert Grant Avenue, Silver Spring, MD 20910. *NMR&D News* is published monthly by the NMRC Public Affairs Office, 301-319-9378, 301-319-9425 or [click here](#) to email us

Commanding Officer
Capt Jacqueline D Rychnovsky

Executive Officer
Capt Eric R. Hall

Director for Administration
Steven S. Legette

Public Affairs Officer
Doris Ryan

Graphic Layout & Design Artist & Editor
Mikelle D. Smith



Use your
smartphone to
access our website!

Navy Medicine R&D Laboratories Represented at Military Health System Research Symposium

Story by Doris Ryan, Naval Medical Research Center Public Affairs



The annual Military Health System Research Symposium (MHSRS) is the Department of Defense's premier scientific meeting highlighting biomedical research and development focusing on the unique needs of the Warfighter. (Photo courtesy of MHSRS)

SILVER SPRING, Md. - The annual Military Health System Research Symposium (MHSRS) is the Department of Defense's premier scientific meeting highlighting biomedical research and development focusing on the unique needs of the Warfighter.

The symposium provided a forum for showcasing and planning research to optimize the health and medical readiness of military members in operational settings. The four-day conference was held in Fort Lauderdale, Florida, August 17- 20.

This year's symposium focused on health care initiatives related to combat casualty care, military operational medicine, clinical and rehabilitate medicine and infectious diseases of military importance.

The Navy Medicine Research and Development enterprise was well represented with more than 70 posters and 25 podium presentations.

"It was a banner year for the Navy Medicine R&D enterprise at the 2015 MHSRS," said Capt. Jacqueline Rychnovsky, Commander

(continued on page 3)

| Report Documentation Page | | | | Form Approved OMB No. 0704-0188 | |
|--|-----------------------------------|------------------------------------|---|---|---------------------------------|
| Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. | | | | | |
| 1. REPORT DATE SEP 2015 | | 2. REPORT TYPE | | 3. DATES COVERED 00-00-2015 to 00-00-2015 | |
| 4. TITLE AND SUBTITLE Naval Medical Research And Development News | | | | 5a. CONTRACT NUMBER | |
| | | | | 5b. GRANT NUMBER | |
| | | | | 5c. PROGRAM ELEMENT NUMBER | |
| 6. AUTHOR(S) | | | | 5d. PROJECT NUMBER | |
| | | | | 5e. TASK NUMBER | |
| | | | | 5f. WORK UNIT NUMBER | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Medical Research Center, ,503 Robert Grant Avenue,,Silver Spring,,MD, 20910 | | | | 8. PERFORMING ORGANIZATION REPORT NUMBER | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | | | | 10. SPONSOR/MONITOR'S ACRONYM(S) | |
| | | | | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) | |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited | | | | | |
| 13. SUPPLEMENTARY NOTES Volume VII, Issue 9,September 2015 | | | | | |
| 14. ABSTRACT | | | | | |
| 15. SUBJECT TERMS | | | | | |
| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT Same as Report (SAR) | 18. NUMBER OF PAGES 21 | 19a. NAME OF RESPONSIBLE PERSON |
| a REPORT unclassified | b ABSTRACT unclassified | c THIS PAGE unclassified | | | |

NMRC Commanding Officer Message



In August the military research world reunited with friends and colleagues in Fort Lauderdale, Florida, for the annual Military Health System Research Symposium (MHSRS). This year 1,700 researchers gathered to share results from military-unique research with the intent of improving medical care to the Warfighter. A notable change at the 2015 conference was the integration of infectious disease (ID) research into the care of the Warfighter. In past conferences there was limited mention of ID, as the focus was more on operational and combat casualty care. This year we had presentations by seven of our eight enterprise laboratories, and the eighth lab was only absent due to the tyranny of distance. This change highlights the importance of the work we do in our labs whose mission is to study, monitor and detect emerging and re-emerging diseases. I predict ID presence at MHSRS will continue to grow in future years. For those who were unable to attend, both poster and podium presentations can be viewed at <https://mhsrs.amedd.army.mil/SitePages/Home.aspx>.

The goal of MHSRS is to “maximize research synergy among all of the branches of military service, while acknowledging the need for service-specific medical capabilities.” There is always excitement in the air at MHSRS, but this year had a different feel. For force protection, a decision was made to wear civilian attire at the conference. While this made suitcase packing less complicated, initially not everyone was a fan of the new dress code. Military uniforms create an immediate impression of professionalism. In an instant the uniform can communicate not only which service we chose, but what our specialty is, how long we’ve served, where we’ve been stationed, and what we’ve accomplished. In a sense, they reflect our brand. With no uniforms in sight, an amazing thing happened. No first impressions were made based on service stigma. We were all simply research colleagues attending a conference to learn, grow and share. Attendees seemed more at ease while approaching each other to discuss common interests. To learn more about another individual required having a conversation, not a perusal of their uniform. It was fun! To coin a baseball phrase as the current season wraps up, the 2015 MHSRS planning committee knocked it out of the park!

NMRC Commanding Officer Sends,
Jacqueline D. Rychnovsky, CAPT, NC, USN

NMRC-Asia Commanding Officer Message

For those that have experienced living and working in an overseas environment it goes without saying that the rewards far outweigh the challenges. Having the opportunity to be forward and engaged with international partners, with the collective goal of reducing the morbidity and mortality associated with infectious disease, is directly aligned with the Chief of Naval Operations’ Cooperative Strategy for 21st Century Seapower. By 2020, approximately 60 percent of U.S. Navy ships and aircraft will be based in the Indo-Asia Pacific region making it paramount that we continue to build those long-term relationships throughout this strategic corridor. Naval Medical Research Unit No. 2 (NAMRU-2) continues to be at the tip of the spear conducting surveillance for emerging infections, mitigating disease risk and contributing to the development of intervention strategies to protect the warfighter. In addition, our partnerships throughout Southeast Asia have the added benefit of enhancing host country medical capability and infrastructure due to the training provided by NAMRU-2 along with capacity building efforts from organizations such as the U.S. Defense Threat Reduction Agency (DTRA). On August 31, a state-of-the-art laboratory, designed and equipped by NAMRU-2 utilizing DTRA funding, was officially opened at the Ream Naval Base Clinic located along the southern coast of Cambodia. A ceremony was held at the National Committee for Maritime Security’s Tactical Headquarters (Ream) followed by a ribbon cutting conducted by the Royal Cambodian Navy Commander, Admiral Tea Vinh and the U.S. Embassy Cambodia Chargé d’Affaires Ms. Julie Chung. It is anticipated that this combined effort by the Cambodian and U.S. militaries will be sustainable and mutually beneficial. Not only will healthcare be enhanced for the 3,000 Royal Cambodia Armed Forces (RCAF) service members working on base and the 25,000 residents living in nearby villages, but more robust surveillance activities can now be executed in southern Cambodia due to the increased laboratory capability coupled with well-trained RCAF technicians and embedded NAMRU-2 staff. Collaborative efforts such as this are a testament to the dedication today’s Navy researchers and support staff have toward the protection of the warfighter and the health of the global community.



NMRC-Asia Commanding Officer Sends,
Marshall Monteville CAPT, MSC, USN

(continued from page 1)

of the Navy Medicine R&D enterprise. "To think that our posters alone comprised nearly eight percent of all posters for three sessions is something our researchers should be very proud of. The range of science presented was complex and diverse, and demonstrates how well rounded we are as an organization."

Commander of Navy Medicine West (NMW) Rear Adm. Bruce L. Gillingham, was very pleased to see NMRC so well represented.

"It [the symposium] was terrific! It was extremely well attended by representatives across the military medical research enterprise," said Gillingham. "The energy and enthusiasm was palpable. Everywhere I looked, researchers were deep in collaborative discussion, clearly pushing each other to deeper levels of understanding. The range, depth and sophistication of the research topics were superb. I was particularly impressed by the tight alignment of the projects with our operational requirements ... I thought that the NMRC presentations and posters were best in class."

Gillingham participated in a Navy specific break out session and he had the opportunity to learn more about the enterprise and to talk to NMRC leadership and researchers.

"As I listened to each of the lab commanders speak, I was proud to know that Navy Medicine West is joining forces with an organization with such a stellar legacy of contributions to the Warfighters' readiness and force protection," said Gillingham.

"Considering that our research enterprise only migrated under Navy Medicine West's leadership on August first of this year, we felt extremely fortunate that Rear Adm. Gillingham was able to attend the symposium," said Rychnovsky. "There's no better way to absorb the depth and breadth



Lt. Jacob Norris speaks at the Military Health System Research Symposium. The annual Military Health System Research Symposium (MHSRS) is the Department of Defense's premier scientific meeting highlighting biomedical research and development focusing on the unique needs of the Warfighter. (Photo courtesy of MHSRS)

of our complex organization than to see it firsthand through research dissemination, face-to-face meetings with stakeholders and sponsors, and attendance at the podium presentations and keynote addresses. The information disseminated seemed especially meaningful to Rear Adm. Gillingham considering his deployment experience, time aboard the hospital ship, and his involvement in establishing the Comprehensive Combat and Casualty Care Center (C5) at Naval Medical Center San Diego. He gets it."

In August of this year, the Navy Medicine Research and Development enterprise came under the umbrella of NMW as part of the BUMED reinvention.

"As I told the group at the Navy breakout, I believe our role at Navy Medicine West is to provide support and advocacy to the NMRC enterprise," said Gillingham. "We have subject matter experts in infrastructure areas such as personnel, operations, logistics,

facilities, information technology, finance, and performance improvement that will strengthen and support NMRC. Our goal is to minimize 'the housekeeping' that the researchers have to do so they can focus on their projects and maximize the impact for the warfighter. With response to advocacy, I look forward to getting the word out about the important work NMRC does to improve and sustain the readiness of our forces to make sure NMRC's equities are well represented with Big Navy and the military health system."

He added, "the men and women of Navy Medicine West are excited to align themselves with NMRC to help burnish its outstanding legacy of operational and clinical research excellence. The synergy gained from this partnership will accelerate both our missions. We can't wait to roll up our sleeves and get started!"

facebook



Naval Medical Research Center is on Facebook!
Stay connected with us via social media.
Please visit and like our page
@ Naval Medical Research Center for updates.



Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

Naval Medical Research Center License Enables Commercialization

Story by Doris Ryan, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. – The outbreak of Ebola that occurred in West Africa presented a number of challenges. One focused on a way to rapidly diagnose patients with the disease, so they could be quickly separated from others who were not infected.

At the time, in the countries affected by the Ebola outbreak, there was no lab assay to systematically rapidly diagnose patients, and the infrastructure, such as the laboratory equipment and facilities needed, were not available.

The Naval Medical Research Center (NMRC) was one of several organizations deployed to help stem the trajectory of the epidemic. NMRC's two mobile laboratories provided critical diagnostic capabilities, which reduced diagnostic time from what had been several days to just a few hours.

The particular diagnostic used was extremely effective, but samples

needed to be transported to the labs for testing. What was needed was a rapid, on-site, diagnostic test that could be done quickly.

"The U.S. Centers for Disease Control and Prevention (CDC) was interested in supporting the development of a diagnostic test to be used at any location," said Dr. Todd A. Ponzio, Director of NMRC's Office of Partnerships and Business Development. "OraSure, a small business in Bethlehem, Pennsylvania, had a distinct platform that could be applied for a prototype device. What the company needed was a sensitive reagent capable of specifically detecting Ebola. NMRC was able to assist, and the prototypes worked."

The commercial partner succeeded in developing a rapid Ebola diagnostic test that can show positive results in four minutes and negative results in 30 minutes. This point-of-care diagnostic test is like a pregnancy test, in that it can be used in any location around the world.

"NMRC negotiated a commercial license agreement with OraSure. This is a nice example of multi-agency government partners working with industry to make a useful product available," said Ponzio. "The license agreement enables the broader commercialization of the device, to include use by agencies of the U.S. government, including DoD, and as well as the U.S. public and interested NGOs. And it's important to recognize the NMRC team effort involved here, especially Cmdr. Billy Pimentel and Dr. Jill Czarnecki. Without their efforts, this product would simply not be available."

At NMRC Ponzio works to advance Navy Medicine technologies and inventions toward becoming accessible products. He focuses on the commercial development of Navy Medicine technologies, and negotiates with industry partners to translate those technologies for use by the Department of Defense and the public.

NAMRU-2 Commanding Officer Attends Ceremony and Ribbon Cutting

Photo and Story Courtesy of NAMRU-2 Public Affairs

U.S. Naval Medical Research Unit No. 2 (NAMRU-2) Commanding Officer, Capt. Marshall Monteville, attended a ceremony held at the Cambodian National Committee for Maritime Security's Tactical Headquarters (Ream), which included a ribbon cutting event conducted by the Royal Cambodian Navy Commander, Admiral Tea Vinh and the U.S. Embassy Cambodia Chargé d'Affaires Ms. Julie Chung for the new Ream Naval Base Clinic.

The new clinic will provide health care in the area and allow NAMRU-2 to conduct infectious disease surveillance in southern

Cambodia. NAMRU-2 currently operates a laboratory located at the National Institutes of Public Health, Phnom Penh, Cambodia.

The mission of NAMRU-2 is to identify infectious disease threats of military and public health importance, as well as develop and evaluate interventions and products to mitigate those threats. NAMRU-2 supports U.S. interests in the Pacific Theater and advances diplomacy in the region by conducting infectious disease research and improving diseases surveillance and outbreak responses.



Navy Surgeon General Visits Groton Submarine Research Facility

Story courtesy of NSMRL Public Affairs



Vice Adm. Matthew L. Nathan, Navy Surgeon General and Chief, U.S. Navy Bureau of Medicine and Surgery (Photo courtesy of NSMRL Public Affairs)

GROTON, Conn. – The Navy Surgeon General and Hospital Corps Force Master Chief (FORCM) visited the Naval Submarine Medical Research Laboratory (NSMRL), July 31.

Vice Adm. Matthew L. Nathan, Navy Surgeon General and Chief, U.S. Navy Bureau of Medicine and Surgery, and FORCM Sherman Boss received a brief overview of the laboratory's mission and recent accomplishments from NSMRL's Commanding Officer, Capt. Fred Yeo. Highlights included NSMRL's research that directly led to the ban on smoking aboard U.S. Navy submarines and the recent adoption of 24 hour-based watch schedules in the Submarine Fleet.

Nathan and Boss toured the research facilities and received current research project updates.

Dr. Michael Qin, principal investigator in the Warfighter Performance Department, demonstrated a number of

cutting edge technologies and how they may be used in the future to benefit the health, welfare, and performance of our warfighters.

Nathan was provided with an immersive visual experience of a patient undergoing surgery in an operating theater using the Samsung Gear virtual reality goggles.

"In the very near future, we may be able to use this technology in the fleet for remote medical training of our corpsmen and doctors," said Qin. "[We hope] to provide a virtual presence of medical specialists to assist in guiding treatment of our injured warfighters in remote locations.

He explained other possible uses, including allowing submarine officers to practice virtually entering a new harbor before they ever arrive at the harbor.

In the area of noise-induced hearing loss (NIHL), Dr. Jeremy Federman, principal investigator in the Submarine Medicine and Survival Systems Department, discussed ongoing efforts to investigate the viability of implementing large-scale fit-testing of hearing protection devices in Sailors and Marines exposed to hazardous noise.

Nathan was able to experience the typical sound levels experienced by Sailors on the Littoral Combat Ship (LCS) from actual LCS sound recordings played through a sound simulation suit of amplifiers and hi-fidelity speakers in NSMRL's reverberant room.

Federman also discussed deployment of complex electronic hearing protection devices with integrated communications to individuals at high risk for NIHL and tinnitus, and who require effective, accurate communications.

The tour shifted to NSMRL's chamber room, possessing the historic Genesis hypo/hyperbaric chamber. SurgCdr John Clarke, who is a British Exchange Medical Officer at NSMRL, explained how NSMRL is currently using the Genesis chamber as a closed environment to determine if CO₂ exposures (at levels similar to those encountered during a submarine deployment) have a significant influence on a submariner's cognitive performance. During his conversation with Clarke, Nathan mentioned his rewarding experience as a medical exchange officer in the United Kingdom and expressed his positive support of the U.S./U.K. exchange officer program.

Nathan's final stop was the diving test pool, where he was able to observe NSMRL's dive locker in action while they were performing a training dive.

"Our enlisted divers and UMO's are a vital part of NSMRL's team and are always ready to support NSMRL's research mission," said NDC Ronald Byrum, NSMRL's diving supervisor.

Nathan expressed his gratitude for the work conducted at NSMRL.

"I consider research vital to our operation and I want to thank you for all the important work you do here at NSMRL," said Nathan. "NSMRL's contributions have a direct impact on our country's future and I just want to thank each of you for everything you do every day for the Navy and for our nation."

NSMRL's mission is to provide innovative human-centric research solutions aligned with the Submarine Force strategic direction, to sustain superiority in the undersea domain.

Joint Combat Casualty Research Team Discusses Future Field Work

Story by Ramin A. Khalili, USAMRMC Combat Casualty Care Research Program Knowledge Manager

FORT LAUDERDALE, Fla. - Lt. Col. Jennifer Hatzfeld, director of the En Route Care Portfolio for the Combat Casualty Care Research Program, sat at the front of a small conference room, flipping through slides on the projector. Up on the screen flashed pictures from the Middle East, various memories from a warzone, snapshots of team members gathered together in Afghanistan, Iraq, and a military base far from home.

"Oh, I remember that day," said audience member Lt. Jacob Norris, a research psychologist at the Naval Medical Research Center (NMRC), pointing to one of the images.

"Yeah," said Maj. Ian Dews, Military Deputy Director of the Combat Casualty Care Research Program, seated on the other side of the room. "You forget how hot it gets over there."

"Everyone forgets," said Cmdr. Gail Chapman, Navy Liaison with the Military Infectious Diseases Research Program, shaking her head. "I probably should've taken more pictures, huh?"

It was a lot of chatter for a small group, but that's how things tend to go when members of a military unit talk shop. In this case, that unit is the Joint Combat Casualty Research Team (JC2RT). From 2006 to 2014, the JC2RT existed as a small group of scientists and clinicians tasked with facilitating ethical and operationally relevant medical research while in the overseas theater of operations. Deployments for team members rotated every six months.

This year for the first time, more than a dozen members of the JC2RT gathered August 19, at the annual Military Health System Research Symposium in Fort Lauderdale, Florida, to plot a course for the unit's future.

"It always felt like what you were doing over there was so important,



Members of the Joint Combat Casualty Research Team gather for a group photo at the 2015 Military Health System Research Symposium in Fort Lauderdale, Florida, Aug. 19. Lt. Jacob Norris, a research psychologist at the Naval Medical Research Center (left, back row) is a member of the group. (Photo by Melissa Myers, USAMRMC Public Affairs)

[yet]difficult," said Hatzfeld. "Getting together like this ... it's almost like a support group."

During the recent conflicts in the Middle East, various iterations of the JC2RT were deployed to help facilitate in-theater research on such conditions as traumatic brain injury and various bleeding disorders. The relatively small size of the group -- usually only a handful of people per deployment -- required members to juggle multiple tasks on their own, including data collection, sample reporting, as well as the review and approval of multiple research protocols.

"When you're working like that, you capture the good, the bad and the ugly parts of the whole process," said Dews describing the 'one-man band' style of approach to research.

The group also tried to carve out a path for the future of the program, including efforts to develop policies to interface with other existing research labs and

create the infrastructure to adequately support future deployed research teams.

"We need to keep the light burning," said Col. Todd Rasmussen, director of the U.S. Army Medical Research and Materiel Command's Combat Casualty Care Research Program (CCCRP). "The home of the JC2RT should be the CCCRP"

With such high-level support now stabilizing the team, the collective focus of the JC2RT shifts to the future, to the next time they're needed for the sake of the Warfighter.

"We're going to need to keep doing this to ensure that this kind of medical research can continue in the middle of a war zone," said Hatzfeld. "It's one of the best ways we can learn to provide the best possible combat casualty care and improve trauma care in the process."

BUMED Director of Total Force (M1) Tours NAMRU-San Antonio

Story by Flisa Stevenson, NAMRU-SA Public Affairs



Dr. Amber Nagy (left), Principal Investigator and Head of NAMRU-SA's Biomaterials and Environmental Surveillance Department, talks about the new efforts underway to develop novel materials to increase the efficiency and specificity of contaminant removal from dental wastewater with, Dr. Andrew Jones (center), Director of Total Force (M1) at BUMED and NAMRU-SA commanding officer Elizabeth Montcalm-Smith (right). (Photo by Flisa Stevenson, NAMRU-SA Public Affairs)

SAN ANTONIO – The Senior Executive Service, Director of Total Force (M1) at the Bureau of Medicine and Surgery (BUMED) visited the Naval Medical Research Unit-San Antonio (NAMRU-SA), August 10.

Dr. Andrew Jones, Director of Total Force (M1) received an overview of current projects to better understand the variety of medical research underway at NAMRU-SA to support wounded warfighters.

Before a tour of the laboratories NAMRU-SA's Commanding Officer Capt. Elizabeth Montcalm-Smith, NAMRU-SA's commanding officer, provided a command brief and summary of ongoing research efforts in combat casualty care and craniofacial health, including one of NAMRU-SA's innovative environmental stewardship and

compliance projects, the novel chairside dental filter that captures mercury-containing amalgam waste before entering any wastewater stream.

Dr. Amber Nagy, principal investigator and Head of NAMRU-SA's Biomaterials and Environmental Surveillance Department explained how the new chairside amalgam separator has been re-designed by Navy researchers to remove up to 96.7 percent of amalgam from dental wastewater and can be the first line of defense at dental treatment facilities to reduce mercury release.

Jones was pleased to learn that Navy dental facilities across the globe are being armed with this novel amalgam filter technology that may establish Navy dental facilities as models of environmental stewardship.

During the tour Jones was introduced to NAMRU-SA's interdisciplinary approach to team science and collaboration encompassing all projects.

Dr. Simecek, head of the Combat Casualty Care Directorate, described a current project that inspired NAMRU-SA's biomedical engineering team to construct a custom electrospinning apparatus, to create a nanofiber-based coating that proteins and antibiotics will be woven into to create a biomimetic wound dressing.

Simecek also highlighted a non-antibiotic treatment option under investigation that uses lasers and gold nanoparticles to break up bacteria cells.

"Innovations and advances in our projects to improve craniofacial wound management and infection control are emerging from internal, industry," said Montcalm-Smith. "[As well as] academic and cross-service collaborations and our research teams are harnessing techniques, approaches, and perspectives from multiple scientific disciplines and therapeutic areas."

Jones also recognized how the collaboration and synergy of research efforts on the San Antonio Military Medical Center campus, where NAMRU-SA is located, presents valuable opportunities to collaborate with other scientists, healthcare specialist, surgeons and dentists to support wounded warfighters and reduce any duplicated efforts across Services.

Story by Regena Kowitz, Naval Health Research Center Public Affairs

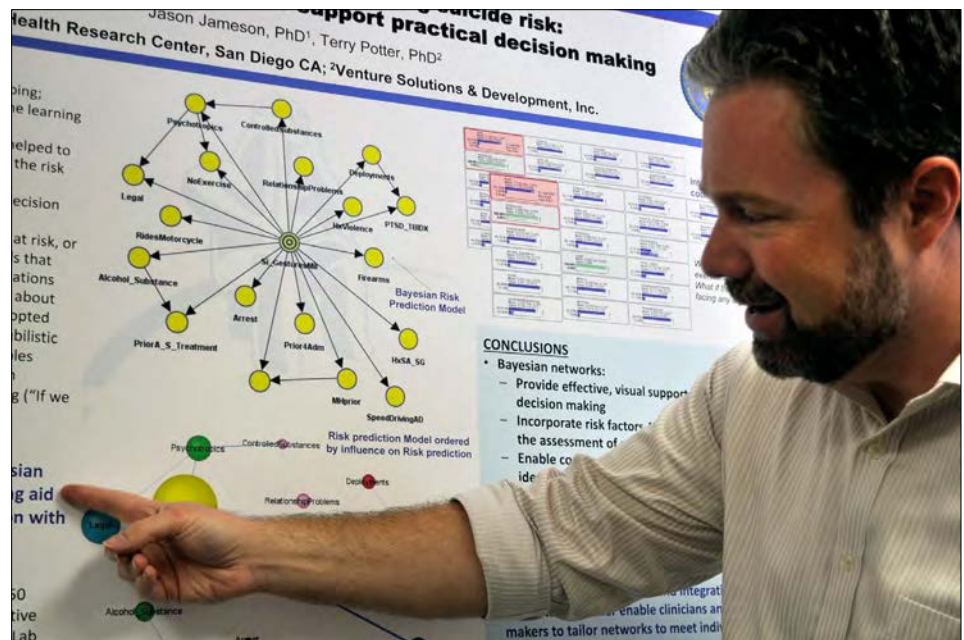
The tool, which is based on Bayesian network analysis, can provide medical personnel and military leaders with information for practical decision-making in support of operational and individual readiness.

A Bayesian network is a type of statistical model that helps to visualize probabilistic relationships that exist among multiple variables. Bayesian networks use Bayesian inference, which can be viewed as a way to reason optimally under uncertainty.

Researchers at NHRC designed the tool to analyze multiple variables within a dataset to calculate an overall suicide risk score. The tool uses algorithms that incorporate risk factors for suicide (e.g., alcohol abuse, domestic violence and previous suicide attempts) as well as protective factors (e.g., strong social support, spirituality).

According to Dr. Jason Jameson, Ph.D., a psychologist who worked on the project along with Dr. Terry Potter, “Simply because two service members have the same risk factors for suicide does not mean they are equally at risk. One service member may have a strong social support network, a known protective factor that can reduce his or her overall risk for suicide. The tool takes these variables into account when calculating a score, more accurately identifying those service members at greater risk for suicide.”

In an operational setting with limited resources, such as having a few mental health providers available, having an accurate risk score can help leaders and medical personnel prioritize resources by



Dr. Jason Jameson with his research poster from the Military Health System Research Symposium (MHSRS), which was held August 17-20, in Fort Lauderdale, Florida. Jameson was part of a team that recently developed a computer-based risk assessment tool, using Bayesian inference algorithms, to help identify service members at increased risk of suicide by calculating a risk assessment score. In addition to helping identify individuals at risk, the tool can also provide recommendations for intervention and treatment based on the service member's unique combination of risk and protective factors. (Photo courtesy of NHRC Public Affairs)

determining which service members need immediate intervention and which are less urgent.

The tool doesn't stop there. The truly innovative aspect of this tool is it can help determine not just who needs intervention, but how best to intervene.

When additional data is added, such as variables for different treatment options (therapy, medication, or even exercise), the tool can help determine which course of action is most likely to provide the best outcome given the service member's unique combination of risk and protective factors. Bayesian networks can do this through counterfactual testing—essentially, the tool provides a way to test multiple “what if?” scenarios to determine which scenario will result in the best possible outcome.

Will anti-depressants or cognitive

behavioral therapy be most effective in reducing a service member's risk for suicide? Or, is starting with an exercise program the best initial course of action? The tool can help a medical provider answer those questions, making it not only a predictive tool, but a practical one as well.

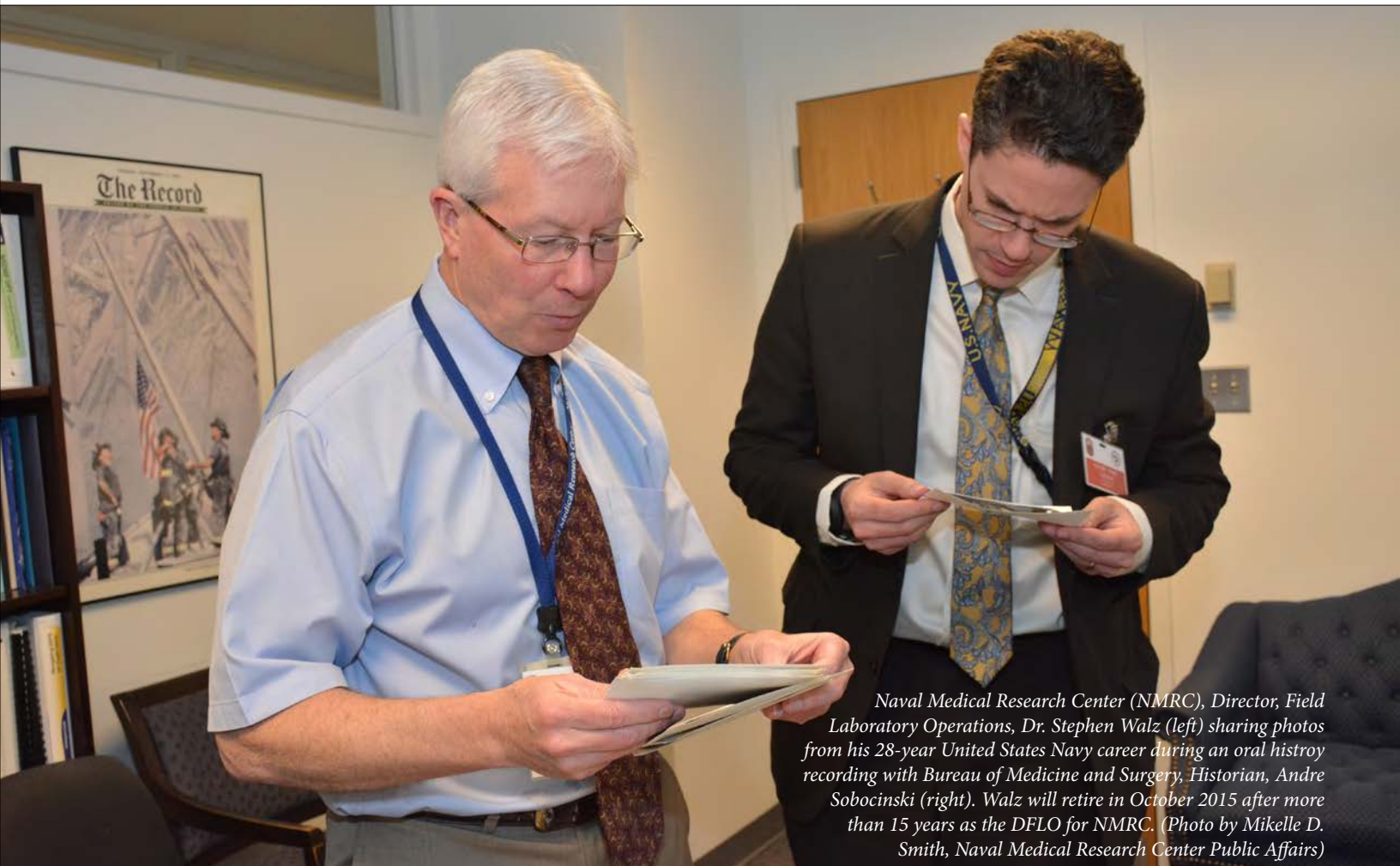
“It was important that the information in the database could be used to make a difference in a live environment on the ground,” said Jameson. “It’s not very useful if it’s just theoretical. The clinician or company commander needs to know what to do next.”

This project began when Lt. Cmdr. Yaron Rabinowitz, an operational psychologist, reached out to NHRC to collaborate on developing a risk assessment tool. Rabinowitz, who had been with the Second Marine Regiment and part of their

(continued on page 10)

NMRC Field Lab Operations Director to Retire in October

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Naval Medical Research Center (NMRC), Director, Field Laboratory Operations, Dr. Stephen Walz (left) sharing photos from his 28-year United States Navy career during an oral history recording with Bureau of Medicine and Surgery, Historian, Andre Sobocinski (right). Walz will retire in October 2015 after more than 15 years as the DFLO for NMRC. (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md. - After more than 11 years as the Director for Field Laboratory Operations (DFLO) at the Naval Medical Research Center (NMRC), Dr. Stephen Walz is preparing for retirement. Walz has been the DFLO since 2004, when he retired from the active duty Navy as an epidemiologist after 28 years of service. Since then, he has devoted his career to ensuring all processes and correspondence between NMRC and seven subordinate laboratories, including three overseas laboratories, has been smooth. He has also helped establish laboratory units in Singapore and Cambodia.

Walz's experience in Navy Medicine Research and Development, extends well into his early years as he graduated from St. Francis College, Loretto, Pennsylvania, in the early 70s, going on to obtain his Master's Degree in Public Health with a concentration in Epidemiology from the

University of Michigan in May 1976.

He was commissioned as a Lt. j.g in the Medical Service Corps (MSC) just a month after finishing his master's and then had an illustrious career serving in various positions before earning his Ph.D. in Microbiology from Baylor College of Medicine, Houston, Texas in 1988.

Walz was part of many research efforts throughout the Naval Medical Research enterprise including being part of Naval Medical Research Institute (NMRI), the legacy command of NMRC; Naval Medical Research Unit No. 2, Manila, Republic of the Philippines; Naval Medical Research Unit No. 3, Cairo; and, Naval Medical Center Detachment (now Naval Medical Research Unit No. 6) Lima, Peru. His final tour landed him at NMRC serving as the Infectious Disease Program Research Area Manager.

"As with most people leaving a position that they have been working in from some time, I will miss all the people who I interact with on a day-to-day basis," said Walz. "We currently have, and previously have had extraordinary researchers here and at the field labs. They all have the scientific insight to secure the competitive funding and do the studies that drive the research forward. I hope that I have enabled some of those efforts over my years."

When asked what he would miss the most about NMRC and the field laboratories, Walz said, "Everyone at NMRC and the field labs have always been gracious and supportive, even when I was pushing them for assistance. The NMRC command and enterprise has a great sense of collective purpose ... this has been a great team to have played for and I will miss the camaraderie."

Bayesian Network Analysis: A Predictive Tool for Suicide Prevention

(continued from page 8)

Operational Stress Control and Readiness Team at the time, had already helped develop a tool to proactively identify service members at risk, but he was interested in developing a more systematic and rigorous way to assess that risk.

“Terry and I started working on this project over a year ago,” said Jameson. “We were initially intrigued by the possibility of applying ‘big data’ tools to analysis of data from military samples. Our original goal was to explore machine-learning

techniques for developing statistical models of expected health trajectories that were the product of high stress. Suicide risk is one potential, and unfortunate, product of high stress.”

In the future, this tool could help prevent service members at risk for suicide from falling through the cracks by acting almost like an automated continuous monitoring system—as more data are added, it can alert leaders and clinicians to service members whose risk scores rise beyond a certain, predetermined threshold.

Potentially, unit commanders and battalion clinicians could use this tool to check unit and individual readiness, with access based on clearance levels that take into account the Health Insurance Portability and Accountability Act and privacy rights.

“At the end of the day, by giving leaders the information they need, when they need it, the research we do at NHRC can help them make the best decisions possible in the face of sometimes considerable uncertainty and significant practical constraints,” said Jameson.

A New Frontier for Understanding Brain Injury

Blog by Lt. Cmdr. Peter Walker, Naval Medical Research Center

SILVER SPRING, Md. - The Neurotrauma Department at the Naval Medical Research Center (NMRC) has adopted an approach to help develop an understanding of the underlying mechanisms behind Traumatic Brain Injury (TBI).

Dr. Francoise Arnaud and I are exploring the use-spectral-graph methods to understand the relationship among multitudes of parameters gathered during the experimentation on aerial evacuation after blast injury and pre-exposure to stress in a laboratory model. Specifically, we are interested in discovering the strongest determining factors that lead to mortality. Advances in computing power and innovative approaches in the field of machine learning have paved the way for a new generation of scientists called data scientists.

These next generations of data scientists seek to extract knowledge and discover insights from large volumes of data through a combination of data mining and predictive analytics. This discipline has come to embrace the diversity necessary to understand the complexity of problems facing a variety of scientific disciplines.

One area of interest among data scientists to explore is the use of graph analytics. Network/Graph models attempt to identify relationships among different variables in a dataset. Edges that connect two nodes in a network suggest that there is a relationship among those variables. The distance between those nodes indicates the strength of the relationship among those variables. More importantly, these relationships can be defined quantitatively; the edge weight can be used to indicate a measure of similarity/dissimilarity between two nodes.

Specifically, Arnaud and I want to apply this form of analytical technique to understand the “small world” properties that might exist within this ongoing work on TBI. Most nodes in the graph can be connected through a series of “jumps” from one node to the next. Through fairly simple computations, the connectedness of a graph can be computed through metrics such as clustering coefficients and path lengths. Properties of small-world networks have been witnessed in a number of different real-world settings including brain activation and the analysis of social network sites.

Many are familiar with the game “six degrees of separation,” which suggests

that any singular individual can be connected to another individual in six or less “jumps” in the network. Such properties are useful to the analyst, as well as the scientist, by illustrating the connectedness of the dataset as a whole while helping to illustrate the relationships among the multitudes of variables.

In the Neurotrauma Department, we are hoping that, through the appropriate analysis and merging of multiple datasets we can develop a deeper understanding behind brain injury and function of the brain. We believe that analytic techniques such as small worlds and data scientists in general, can help to unravel complex cause and effect relationships that might exist within these large datasets. For example, our group is currently exploring the possibility of an interaction between altitude exposure, physiological stress, and survivability.

We believe that a small world model will help us to understand how these different variables directly (or indirectly) affect survivability. In the end, such approaches may not only yield better insights into the mechanisms of injury, but also provide a promise for better diagnosis and treatment for our wounded warriors.

NAMRU-D's Joint Effort on Pilot Physiological Monitoring and Warning System

Story by Dr. William Albery, Dr. Jeff Phillips and Dr. Lloyd Tripp, NAMRU-Dayton



Naval Aviators on Naval Air Station Whidbey Island, Washington (Photo courtesy of United States Navy Multimedia Gallery)

DAYTON, Ohio - The Naval Medical Research Unit-Dayton (NAMRU-D) and the 711th Human Performance Wing (711 HPW) of the Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base (WPAFB) are jointly working on a Foreign Comparative Test (FCT) program to provide a physiological monitoring and warning system for both Air Force and Navy pilots.

It is said the modern fighter aircraft provides more than 1500 signals/sec to the pilot concerning engine, avionics and flight systems; however, not one of these signals is from the pilot, the most critical part of the weapon system.

The Air Force recently developed an ad hoc physiological sensing system for F-22 pilots after 25 hypoxic-like symptoms were reported by pilots during operations. The non-invasive sensor was integrated into the ear cup of the helmet and was successful at monitoring oxygen saturation

during flight. This was not an off-the-shelf system but, rather, developed by the 711th HPW to address an urgent need by the USAF Air Combat Command.

The Israeli Air Force developed a physiological sensing flight helmet that can non-invasively measure blood perfusion changes, percent oxygen saturation, and heart rate. In addition, the Japanese Air Force has developed a portable pocket-sized near infrared spectroscopy monitoring system that shows promise as an in-flight physiological monitoring system. These systems will be tested at Wright-Patterson Air Force Base starting fall 2015.

The objective of this FCT program is to evaluate non-invasive physiological sensors to monitor aircrew state, in order to warn of an impending physiological problem that could lead to an in-flight mishap.

No physiological warning system for pilots of USAF or USN aircraft currently exists. Recent hypoxia-like physiologic events in T-45, F-18, F-22 and F-35 aircraft highlight the importance of having an in-flight pilot monitoring system in order to prevent loss of lives and aircraft.

A non-invasive physiological monitoring system for aircrew would be able to monitor heart rate, blood oxygen saturation, carbon dioxide levels, eye metrics and potentially electroencephalogram. Such monitors could warn the pilot of redline or out-of-bounds physiological conditions that might compromise performance and adversely affect the mission. Data from the monitors could also help with mishap investigations by providing key information on the state of the pilot prior to an incident.

R&D Chronicles

Navy Medical Research and Project Mercury Part I: The Johnsville Human Centrifuge

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery

"Here is a multimillion-dollar unique device developed by the Navy, but of such capability that it has received world-wide attention. It has been employed and will be employed as a tool for solving problems of interest to not only the Navy but to the USAF, NASA, industry, and science."

~Capt Clifford P. Phoebus, Medical Corps, USN, December 1959

In 1959, the National Aeronautical Space Administration (NASA) embarked on an ambitious program to prepare seven military pilots for the first man-in-space program, Project Mercury. Over the next several years, NASA would send its Mercury Seven astronauts through a gauntlet of classes, training and tests across the United States to ensure they had the "Right Stuff" for orbital flight.

The Navy Medical Department would collaborate with NASA from the very beginning of the space program. Navy medical physicians and scientists would act as NASA advisors and medical monitors; and, Navy medical researchers in Bethesda, Maryland, New London, Connecticut, Pensacola, Florida and Warminster, Pennsylvania, would help ensure the success of Project Mercury.

The Aviation Medical Acceleration Laboratory (AMAL) was one of the institutions vital to man's



(Above) Naval Medical Research Institute (NMRI) Navy officers part of the Mercury 7 mission: Gordon Cooper, Wally Schirra, Donald Slayton, Alan Shepard, John Glenn, Scott Carpenter and Gus Grissom. (Photo courtesy of Naval Medical Research Center Public Affairs)

journey into space. Established in 1949 at the Naval Air Development Station in Warminster, Pennsylvania, AMAL was best known as the home of the



largest centrifuge in the world. Constructed by the McKiernan-Terry Corporation under the cognizance of the Special Devices Center of the Office of Naval Research, the centrifuge was housed in a 125-foot diameter room and consisted of a gondola on the end of a 50-foot arm mounted on one of the largest DC motors in existence—a 180-ton, 4,000 horsepower General Electric motor

with peak burst of 16,000 horsepower. The device could accelerate from 0-173 miles per hour in just seven seconds generating 40 G's of radial acceleration. It was built on land that was 98 percent bedrock and what was considered "the most stable piece of land in North America."

In essence, the centrifuge was a flight simulator built to test resilience to G(ravity)-forces and also techniques for reducing G-LOC (gravity-induced loss of consciousness). From 1959 to 1963, the centrifuge was used almost exclusively by NASA to evaluate anti-blackout procedures, to simulate conditions of the Mercury

(continued on page 15)

Navy Medicine R&D Attends 2015 Military Health System Research Symposium



Research and Realism Enhance Readiness: Highly Realistic Training for IDC Students

Story courtesy of Naval Health Research Center Public Affairs



A student from Independent Duty Corpsman (IDC) School practices her trauma combat casualty care (TCCC) skills on an actor during a simulated mass casualty training. Researchers from the Naval Health Research Center (NHRC) worked with instructors from IDC school to develop highly realistic training for the students to study how this training method increased their confidence in their abilities to provide hands-on medical care in operational settings. (Photo courtesy of Tommy Hughes)

SAN DIEGO – Imagine you’ve just graduated from a school that taught you how to be an independent medical provider. Now imagine you have a critically injured patient whose life is in your hands. If that weren’t stressful enough, you have to treat them in the middle of a warzone with bullets flying, the air filled with smoke and screams.

How confident would you be in your ability to provide life-saving care? Would you be confident if you’d never been in a situation like this? Would training in a realistic, operational environment help you be better prepared?

In 2013, a team of researchers from the Naval Health Research Center (NHRC) launched a study to answer those questions. They wanted to learn if Independent Duty Corpsmen (IDCs), enlisted personnel trained to provide advanced medical care independent of a physician, would have increased

confidence in their ability to provide care in an operational setting if simulated battlefield scenarios were part of their training.

The team worked with leadership at the Surface Warfare Medical Institute’s (SWMI) Independent Duty Corpsman School in San Diego to develop and implement the training. The scenarios were developed with the expertise of IDC school instructors and required students to correctly assess and treat specific medical problems such as uncontrolled bleeding, respiratory distress, and blast wounds.

Live actors (some of them combat-injured veterans) played the role of trauma patients, adding elements of realism. Actors interacted with the students during scenarios, yelling, screaming, and even resisting treatment. Some actors wore cut suits that allowed participants to practice hands-on medical care (controlling bleeding, inserting chest tubes).

The overall goal was to test the IDC students’ ability to use their trauma combat casualty care (TCCC) skills while managing single and mass casualty situations.

Another dose of reality came from the location. The training took place at a television and film studio in San Diego, using pyrotechnics and sets designed to replicate real places IDCs would encounter after graduation including a ship, a village in a combat zone, and a flight deck.

The project ran from February 2013 through December 2014, with the simulation incorporated as part of the students’ final exercise for their trauma unit. NHRC researchers measured satisfaction with the simulated training; career intentions; and, general, occupational, and task-specific self-efficacy using pretest and post-test surveys from a sample consisting of 290 male and female service members enrolled in IDC School.

“It was important for us to know if the corpsmen were satisfied with the training and with specific elements of the training as this information could lead to modifications in the future,” said Dr. Stephanie Booth-Kewley, research psychologist at NHRC.

According to Booth-Kewley, the team hypothesized that IDC students would express high levels of satisfaction with the training, significant increases in their self-efficacy, and increases in perceived readiness and career intentions.

“All of our expectations were confirmed, except career intentions did not change,” said Booth-Kewley. “This isn’t surprising given that most of the corpsmen in this sample had been in the Navy for a fairly long time, with an average tenure of nine years.”

(continued on page 16)

Navy Medical Research and Project Mercury

Part I: The Johnsville Human Centrifuge

(continued from page 12)

capsule above 27,000 feet, the acceleration profiles of boost phases and re-entry phases, and also used to study the astronaut full-pressure suit.

Each of the Mercury Seven astronauts would spend about 10 hours in the centrifuge. John Glenn called the centrifuge "sadistic" and "dreaded." Alan Shepherd would call it the most important preparation for his historic May 5, 1961, flight into space. Even Ham, the first chimp in space, underwent acceleration training at AMAL.

AMAL's centrifuge continued to be used to train astronauts into the 1980s. Its last run took place in 2005. Today, the old centrifuge is still in existence and now part of the Johnsville Centrifuge and Science Museum in Warminster, Penn.

(Right) Astronaut Virgil (Gus) Grissom seen preparing for training in centrifuge at AMAL. A Navy Corpsman attaches sensors to Grissom to monitor his body's reaction to the centrifuge. (Photo courtesy of BUMED Historian)



NAMRU-6 Hosts Hands-On Field Epidemiology Course

Story courtesy of NAMRU-6 Public Affairs

LIMA, Peru - Chikungunya, Dengue, Influenza, Ebola and other RNA viruses have emerged as serious health concerns worldwide and are a significant threat to U.S. troops at home and abroad.

While the U.S. military deployed key laboratories during the recent Ebola outbreak in West Africa, the outbreak revealed a gap in the capacity of civilian organizations to rapidly deploy to austere locations and safely diagnose lethal viruses. The U.S. Naval Medical Research Unit No. 6 (NAMRU-6) hosted a field epidemiology course in Lima and Tumbes, Peru, August 3 – 14.

The course trained more than 12 students from the University of Texas Medical Branch, USA, and



NAMRU-6 Field Epidemiology students learn proper donning and wearing of Personal Protective Gear. (Photo courtesy of NAMRU-6 Public Affairs)

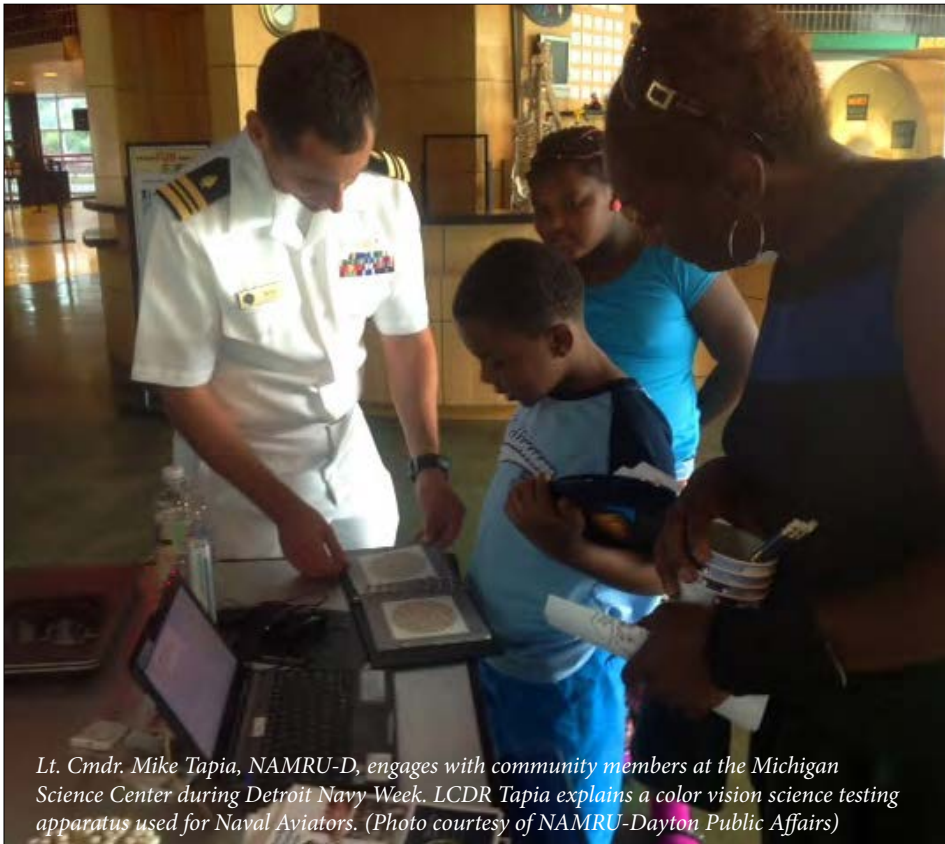
two from Universidad de Los Andes, Colombia, all with different academic training including physicians, nurses, microbiologists and entomologists.

Lt. Vince Gerbasi, head for the NAMRU-6 Parasitology Department, who deployed to West Africa in

(continued on page 17)

NAMRU-D Lieutenant Commander Joins Navy Medicine Ambassadors at Detroit Navy Week

Story courtesy of NAMRU-D Public Affairs



Lt. Cmdr. Mike Tapia, NAMRU-D, engages with community members at the Michigan Science Center during Detroit Navy Week. LCDR Tapia explains a color vision science testing apparatus used for Naval Aviators. (Photo courtesy of NAMRU-Dayton Public Affairs)

DAYTON, Ohio - Navy Medicine Ambassadors brought personal and professional experiences, and connected with young people, parents, and other audiences at a variety of venues during Detroit Navy Week 2015. Navy Weeks provide outreach to area residents to learn about the Navy, its people, and its importance to national security and prosperity. Outreach efforts focused on corporate, civic, government, education, media, veterans, community service, and diversity groups. The 2015 schedule includes Navy Medicine Ambassadors in eight of the twelve planned Navy Weeks, including this one in Detroit.

Lt. Cmdr. Mike Tapia of Naval Medical Research Unit - Dayton (NAMRU-D) joined the Navy Medicine Ambassador team during Detroit Navy Week,

(continued on page 19)

Research and Realism Enhance Readiness: Highly Realistic Training for IDC Students

(continued from page 14)

One of the findings was that the increase in task-specific self-efficacy was particularly large.

“Our finding on task-specific self-efficacy is not surprising,” said Booth-Kewley. “The training focused on improving the students’ hands-on trauma skills and it was hoped that the training would allow students to both perfect and gain confidence in performing those skills in battlefield conditions.”

According to Master Chief Hospital Corpsman Brad Kowitz, IDC School program director, the simulated

training helps students improve confidence in their skills by reducing the initial stress that comes when treating a trauma patient for the first time.

“The best part of the training is taking students away from the classroom, placing them in a very realistic environment, and watching them evolve during the two days they’re out there,” said Kowitz. “On the first day, they are overwhelmed and distracted by all the external stimulation in the simulated training environment. At the end of the training, they are more confident, more relaxed, and more focused on treating their patients.

They are transformed.”

With NHRC’s initial study complete, the training has become a routine part of IDC School training, a successful transition of research into practice.

As the Navy transitions away from live tissue training, highly realistic training holds promise as an effective way to prepare Navy medical personnel to be mission ready and deliver high-quality care in a variety of operational settings, on land and at sea.

NAMRU-6 Hosts Hands-On Field Epidemiology Course

(continued from page 15)

response to the Ebola outbreak said, "If lessons learned from Operation United Assistance teach us anything, it is that we need to train less in program management and more in rapidly deployable laboratory capabilities."

NAMRU-6 civilian research physician Dr. Juan Francisco Sanchez led the course with several American and Peruvian professors contributing to the lectures and practicum.

During the course students received advanced training on the diagnosis of viruses, parasites and pathogenic bacteria. Additionally, students gained hands-on experience in trapping common animal reservoirs and vectors that harbor lethal viruses such as bats, mice and mosquitoes.

A wide range of non-surveillance topics were covered including ethical considerations surrounding obtaining human samples during outbreaks and occupational health concerns.

The students practiced rapid assembly of laboratory equipment, personal protective equipment and biosafety cabinets.

In a final activity to tie the training together, the students participated in epidemiological surveillance and performed their own field outbreak research in Tumbes.

The skills gained by course participants generated an additional group of civilian personnel trained in field techniques that will be prepared to volunteer for the next major outbreak.

NAMRU-6 is hosted by the Peruvian Navy and co-located at their flagship hospital in Lima, at the Naval Hospital in Iquitos, and in Puerto Maldonado.

NAMRU-6 conducts research on and surveillance of a wide range of infectious diseases that are of military or public health significance in the region. Researchers focus on understanding and developing protective strategies against infectious diseases affecting uniformed service members and the general population in Peru and throughout Central and South America while enhancing public health capacity through respectful cooperation with our collaborators.

My Summer Internship at NMRC

Blog by Daniel Wang, University of Maryland-College Park



Naval Enterprise Internship Program (NREIP) participant, Mr. Daniel Wang (right), a University of Maryland-College Park student, speaks with Naval Medical Research Center (NMRC) NREIP and Science Engineering Apprenticeship Program (SEAP) coordinator, Lt. Kimberly Edgel (left) during the summer poster presentation held in the Albert R. Behnke Auditorium on Forest Glen Annex, Silver Spring, Maryland, Aug. 6, 2015. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

COLLEGE PARK, Md. - This summer I had a unique and rewarding experience conducting clinical trial research and bench/laboratory research at the Naval Medical Research Center as part of the Naval Enterprise Internship Program (NREIP). I was able to see the impact that research has on military personnel, the ones that protect the country and who are willing to give up their lives to protect fellow citizens. Additionally, it helped me see how clinical and basic research coalesce and tackle the scientific mechanisms underlying human health and medicine.

I was assigned to participate in projects related to establishing a Controlled Human Malaria Infection (CHMI), which is a method used to evaluate the efficacy of malaria vaccines in

(continued on page 19)

NAMRU-Dayton Receives Meritorious Unit Commendation

Story courtesy of NAMRU-D Public Affairs



On behalf of the command, Mrs. Freda Gatewood accepted the Meritorious Unit Commendation as the longest standing command member. (Photo courtesy of NAMRU-Dayton Public Affairs)

DAYTON, Ohio - The Meritorious Unit Commendation (MUC) was presented during an All Hands Call at Wright Patterson Air Force Base by Naval Medical Research Unit – Dayton (NAMRU-D) Commanding Officer, Capt. Jeffrey Andrews, and NAMRU-D Executive Officer, Capt. Lee, Aug. 28.

On behalf of the command, Mrs. Freda Gatewood accepted the award as the longest standing command member. The award recognizes NAMRU-D's meritorious service from October 2010 to October 2014.

Chief of Naval Operations (CNO) Adm. Jonathan W. Greenert wrote a citation, which was read during the MUC ceremony presentation.

In his citation, Greenert wrote, "The personnel of [NAMRU-D] displayed sustained superior performance by providing critical research capabilities in areas of Toxicology and Aerospace Medicine that allowed the Navy and the Department of Defense to maintain mission essential capabilities and meet mission requirements. Following the Congressionally mandated assignment of

women to submarines, [NAMRU-D] personnel conducted extensive study using state-of-the-art facilities and top scientists in the field of Toxicology to show that inhaling the basic composition of submarine air does not pose reproductive or developmental health risks for mixed gender crews. Responding to the grounding of the F-22 Fleet in the wake of reports of possible hypoxia events, they identified and optimized use of key sensors that alleviated concerns about pilot safety and allowed reactivation of the F-22 Fleet. Furthermore, their handling of Records Management and Human Research Protection Programs led to process improvement methods that were recognized as best business practices for the Navy medicine enterprise. Their 'people first' focus and stellar command climate surveys led to the command's selection as a winner of the 2014 'When Work Works' Award for its innovation in fostering a culture of workplace trust, effectiveness, and flexibility. By their truly distinctive accomplishments, unrelenting perseverance, and unflinching devotion to duty, the officers and civilian employees of NAMRU-D reflected credit upon [them] and upheld the highest traditions of the United States Naval Service."

My Summer Internship at NMRC

(continued from page 17)

human research subjects who have been immunized with the candidate vaccines. I learned how much regulatory and ethical approvals and checkpoints must be passed to initiate the clinical projects. During the first few weeks of my internship, I was trained in human research protection, Good Clinical Practices (GCP), Standard Operating Procedures (SOP) and Study Specific Procedures (SSP), and Quality Assurance and Control, all of which revolve around the foundational principle of protecting the safety and welfare of the human subjects.

During my internship, I was trained with basic rules and procedures and then joined the clinical team to assist in research subject recruitments, evaluation, and enrollment; subject randomization; vaccination; CHMI with infectious malaria parasites; and, subsequent monitoring and follow-up of subjects during post-challenge.

I conducted experiments in the Flow Cytometry Center optimizing surface marker identification in order to detect immune cells against malaria with enhanced accuracy and sensitivity, and to help out with cellular immune phenotyping and analysis. Combining both the bench research and clinical research, I witnessed how clinical research was carried out from the beginning of protocol initiation and subject recruitment, to the final execution of administering infectious materials to human subjects via

the CHMI and closely monitored follow-up.

Seeing and understanding the impact the vaccine had on these individuals helped me fully comprehend the importance of clinical research. Additionally, another rewarding experience I gained included a unique shadowing opportunity with the Walter Reed National Military Medical Center Pediatric Infectious Diseases (PEDS ID) Department.

By following physicians from the PEDS ID Department who see patients coming to the hospital with different and various diseases presentations, I gained a broad sense of how all medicine is applied across many different infectious diseases. It showed me how an infectious disease, such as malaria, truly affects all aspects of the body and different specialties of medicine. Being able to have direct impact on patient health truly motivates physician scientists and physician scientists in training and develops a strong passion for what they do and can do.

As part of the NREIP, I am tremendously grateful for this unique summer internship at NMRC. My internship was truly an integrated experience giving me insight into how a scientist and physician would go about their everyday life for their career. I now understand medicine comes full circle and passion, vision, and honor is required to be successful.

NAMRU-D Lieutenant Commander Joins Navy Medicine Ambassadors at Detroit Navy Week

(continued from page 16)

August 24-30, 2015.

The team was led by Rear Admiral Victor Hall, Deputy Commander, Navy Medicine West and Deputy Corps Chief. Other Ambassadors were Capt. Mae Pouget, Bureau of Medicine and Surgery (BUMED); Capt. John Hoelsher, BUMED; and Lt. Cmdr. Dwight Hampton, BUMED.

Following the Kick-off event Tuesday morning, August 25, Ambassadors spread the Navy Medicine message at the Detroit Zoo while talking with guests. Another morning was spent talking with doctors, health professionals, and members of Detroit-local high school golf teams to discuss best practices with respect to youth nutrition. Another morning the Ambassadors participated in a community

youth engagement for Girl Scouts, Boy Scouts, and Sea Cadets at Rousch Racing Hangar which included members of the Blue Angels.

Other outreach locations were Blue Cross Blue Shield and the Michigan Science Center. Lastly, Hall and the Navy Medicine Ambassadors visited Wayne State University School of Medicine and College of Nursing and VA Ann Arbor Hospital to meet with leadership and tour of each facility.

Navy Weeks are intended to take place in cities that do not have a significant naval presence to increase Americans understanding of the Navy.